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INTERNATIONAL FORESTRY EXHIBITION.

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(599) **WORKS ON FOREST SCIENCE.**

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BY THE REV. J. C. BROWN, LL.D.

EDINBURGH : OLIVER & BOYD.

LONDON : SIMPKIN, MARSHALL, & CO., AND W. RIDER & SON.

MONTRÉAL : DAWSON, BROTHERS.

I.—Introduction to the Study of Modern Forest Economy. Price 5s.

In this there are brought under consideration the extensive destruction of forests which has taken place in Europe and elsewhere, with notices of disastrous consequences which have followed—diminished supply of timber and firewood, droughts, floods, landslips, and sand-drifts—and notices of the appliances of Modern Forest Science successfully to counteract these evils by conservation, planting, and improved exploitation, under scientific administration and management.

EXTRACT FROM PREFACE.—‘At a meeting held on the 28th of March last year (1883), presided over by the Marquis of Lothian, while the assemblage was representative of all interests—scientific, practical, and professional—it was resolved :—“That it is expedient in the interests of forestry, and to promote a movement for the establishment of a National School of Forestry in Scotland, as well as with a view of furthering and stimulating a greater improvement in the scientific management of woods in Scotland and the sister countries which has manifested itself during recent years, that there should be held in Edinburgh, during 1884, and at such season of the year as may be arranged, an International Exhibition of forest products and other objects of interest connected with forestry.” It was then moved, seconded, and agreed :—“That this meeting pledges itself to give its hearty co-operation and patronage to the promotion of an International Forestry Exhibition in Edinburgh in 1884; and those present resolve to give their best efforts and endeavours to render the Exhibition a success, and of such importance and general interest as to make it worthy of the name of International.”

‘It is in accordance with this resolution, and in discharge of obligations which it imposed, that this volume has been prepared.’

II.—The Forests of England; and the Management of them in Bye-gone Times. Price 6s.

Ancient forests, chases, parks, warrens, and woods, are described; details are given of destructive treatment to which they have been subjected, and of legislation and literature relating to them previous to the present century.

EXTRACT FROM PREFACE.—'Contrast with this [the paucity of works in English on Forest Science], the richness of Continental languages in literature on such subjects. I have had sent to me lately *Ofversigt of Svenska Skogs-litteraturen, Bibliografiska Studierien of Axel Cnattingius*, a list of many books and papers on Forest Science published in Sweden; I have also had sent to me a work by Don José Jordana y Morera, Ingenero de Montes, under the title of *Apuntes Bibliographicos Forestales, a catalogue raisonné of 1126 printed books, MSS., &c.*, in Spanish, on subjects connected with Forest Science.

'I am at present preparing for the press a report on measures adopted in France, Germany, Hungary, and elsewhere, to arrest and utilise drift-sand by planting them with grasses and trees; and in *Der Europäische Flug-sand und Seine Cultur, von Josef Wessely General Domaen-en-Inspecteur, und Forst-Academie-Direktor*, published in Vienna in 1873, I find a list of upwards of 100 books and papers on that one department of the subject, of which 30, in Hungarian, Latin, and German, were published in Hungary alone.

'According to the statement of one gentleman, to whom application was made by a representative of the Government at the Cape, for information in regard to what suitable works on Forest Economy could be procured from Germany, the works on *Forst-Wissenschaft*, Forest Science, and *Forst-Wirthschaft*, Forest Economy, in the German language may be reckoned by cartloads. From what I know of the abundance of works in German, on subjects connected with Forestry, I am not surprised that such a report should have been given. And with the works in German may be reckoned the works in French.

'In Hermann Schmidt's *Fach Katalogue*, published in Prague last year (1876), there were given the titles, &c., of German works in *Forst und Jagd-Litteratur*, published from 1870 to 1875 inclusive, to the 31st of October of the latter year, amounting in all to 650, exclusive of others given in an appendix, containing a selection of the works published prior to 1870. They are classified thus:—General Forest Economy, 93; Forest Botany, 60; Forest History and Statistics, 50; Forest Legislation and Game Laws, 56; Forest Mathematics, 25; Forest Tables and Measurements, &c., 148; Forest Technology, 6; Forest Zoology, 19; Peat and Bog Treatment, 14; Forest Calendars, 6; Forest and Game Periodicals, 27; Forest Union and Year Books, 13; Game, 91; Forest and Game in Bohemian, 44. In all, 652. Upwards of a hundred new works had been published annually. Amongst the works mentioned is a volume entitled *Die Litteratur der letzten sieben Jahre (1862-1872) aus*

dem Gesamtgebiete der Land- und Forst-wirtschaft mit Einschluss der landw. Geweber u. der Jagd, in deutscher, französischer u. englischer Sprache Herausg. v. d. Buchandl. v. Gerold and Co., in Wien, 1873, a valuable catalogue filling 278 pages in large octavo.

'This volume is published as a small contribution to the literature of Britain, on subjects pertaining to Forest Science.'

'It is after due consideration that the form given to the work—that of a compilation of what has been stated in works previously published—has been adopted.'

III.—Forestry of Norway. Price 5s.

There are described in successive chapters the general features of the country. Details are given of the geographical distribution of forest trees, followed by discussions of conditions by which this has been determined—heat, moisture, soil, and exposure. The effects of glacial action on the contour of the country are noticed, with accounts of existing glaciers and snow-fields. And information is supplied in regard to forest exploitation and the transport of timber, in regard to the export timber trade, to public instruction in sylviculture, and to forest administration, and to ship-building and shipping.

EXTRACT FROM PREFACE.—'In the spring of 1877, while measures were being taken for the formation of an Arboretum in Edinburgh, I issued a pamphlet entitled *The Schools of Forestry in Europe: a Plea for the Creation of a School of Forestry in connection with the Arboretum in Edinburgh*. After it was made known that arrangements were being carried out for the formation of an International Exhibition of forest products, and other objects of interest connected with forestry, in Edinburgh with a view to promoting the movement for the establishment of a National School of Forestry in Scotland, and with a view of furthering and stimulating a greater improvement in the scientific management of woods in Scotland, and the sister countries, which has manifested itself during recent years, the council of the East Lothian Naturalists' Club resolved on having a course of lectures or popular readings on some subject connected with forestry, which might enable the members and others better to profit by visits to the projected Exhibition, and which should be open to the public at a moderate charge. The conducting of these was devolved upon me, who happened to be vice-president of the club. The following treatise was compiled from information then in my possession, or within my reach, and it constituted the basis of these lectures.'

IV.—Finland: its Forests and Forest Management.
Price 6s 6d.

In this volume is supplied information in regard to the lakes and rivers of Finland, known as *The Land of a Thousand Lakes*, and as *The Last-born Daughter of the Sea*; in regard to its physical geography, including notices of the contour of the country, its geological formations and indications of glacial action, its flora, fauna, and climate; and in regard to its forest economy, embracing a discussion of the advantages and disadvantages of *Svedjande*, the *Sartage* of France, and the *Koomaree* of India; and details of the development of Modern Forest Economy in Finland, with notices of its School of Forestry, of its forests and forest trees, of the disposal of its forest products, and of its legislation and literature in forestry are given.

EXTRACT FROM PREFACE.—‘I happened to spend the summer of 1879 in St. Petersburg, ministering in the British and American Chapel in that city, while the pastor sought relaxation for a few months at home. I was for years the minister of the congregation worshipping there, and I had subsequently repeatedly spent the summer among them in similar circumstances. I was at the time studying the Forestry of Europe; and I availed myself of opportunities afforded by my journey thither through Norway, Sweden, and Finland, by my stay in Russia, and by my return through Germany and France, to collect information bearing upon the enquiries in which I was engaged. On my return to Scotland I contributed to the *Journal of Forestry* a series of papers which were afterwards reprinted under the title *Glances at the Forests of Northern Europe*. In the preface to this pamphlet I stated that in Denmark may be studied the remains of forests in pre-historic times; in Norway, luxuriant forests managed by each proprietor as seemeth good in his own eyes; in Sweden, sustained systematic endeavours to regulate the management of forests in accordance with the latest deliverances of modern science; in Finland, *Sartage* disappearing before the most advanced forest economy of the day; and in Russia, *Jardinage* in the north, merging into more scientific management in Central Russia, and *Reboisement* in the south. This volume is a study of information which I then collected, together with information which I previously possessed, or have subsequently obtained, in regard to the Forests and Forestry of Finland.’

Translation of Extracts from Letters from Dr. A. BLOMQVIST, Director of the Finnish National School of Forestry at Evois:—‘On my return from Salmos three weeks ago I had the great pleasure to receive your volume on the Forests and Forest Management in Finland. I return

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you grateful thanks for the gift, and no less for publishing a description of the forestal condition of our country. It is with sentiments of true gratitude I learn that you had previously taken part in a work so important to our country as the preparation of a new edition of the New Testament in Finnish. Your descriptions of our natural scenery are most excellent and interesting. Personally I feel most interest in your accounts of *Koomaree*. I value it much, and not less so your concurrent final conclusion in regard to the effects of the exercise of it in Finland.'

Translation of Statement by M. DE LA GRYE, in the *Revue des Eaux et Forêts* of January 1884 :—‘In an address delivered some weeks since at a banquet of exhibitors in the French section at Amsterdam, M. Herisson, Minister of Commerce, expressed an intention to publish a series of small books designed to make known to French merchants foreign lands in a commercial point of view. If the Minister of Commerce wishes to show to our merchants the resources possessed by Finland, he need not go far to seek information which may be useful to them, they will be found in a small volume which has just been published by Mr John Croumbie Brown.

‘Mr Brown is one of those English ministers, who, travelling over the world in all directions [some at their own cost], seeking to spread the Word of the Lord in the form of Bibles translated into all languages, know how to utilise the leisure left to them at times while prosecuting this mission. Some occupy themselves with physical science, others with archaeology, some with philology, many with commerce ; Mr Brown has made a special study of sylviculture. He has already published on this subject many works, from amongst which we may cite these : *Hydrology of South Africa* ; *The Forests of England* ; *The Schools of Forestry in Europe* ; *Réboisement in France* ; *Pine Plantations on Sand Wastes in France*.

‘His last book on Finland is the fruit of many journeys made in that country, which he visited for the first time in 1833, but whither he has returned frequently since that time. Mr Brown gives narratives of his voyages on the lakes which abound in Finland, and his excursions in the immense forests, the exploitation of which constitutes the principal industry of the country. The School of Forestry at Evoie has furnished to him much precise information in regard to the organisation of the service, and the legislation and the statistics of forests, which, added to what he had procured by his own observation, has enabled him to make a very complete study of this country, poetically designated *The Land of a Thousand Lakes*, and which might also justly be called *The Kingdom of the Forest*, for there this reigns sovereign.’

V.—Forest Lands and Forestry of Northern Russia.

Price 6s 6d.

Details are given of a trip from St. Petersburg to the forests around Petrozavodsk on Lake Onega, in the government of Olonetz ; a description of the forests

on that government by Mr Judrae, a forest official of high position, and of the forests of Archangel by Mr Hepworth Dixon, of Lapland, of the land of the Samoides and of Nova Zembla ; of the exploitation of the forests by *Jardinage*, and of the evils of such exploitation ; and of the export timber trade, and disposal of forest products. In connection with discussions of the physical geography of the region information is supplied in regard to the contour and general appearance of the country ; its flora, its forests, and the palaeontological botany of the regions beyond, as viewed by Professor Heer and Count Saporta ; its fauna, with notices of game, and with copious lists of coleoptera and lepidoptera, by Forst-Meister Gunther, of Petrozavodsk.

EXTRACT FROM PREFACE.—‘In the spring of 1877 I published a brochure entitled *The Schools of Forestry in Europe: a Plea for the Creation of a School of Forestry in connection with the Arboretum in Edinburgh*, in which with details of the arrangements made for instruction in Forest Science in Schools of Forestry in Prussia, Saxony, Hanover, Hesse, Darmstadt, Wurtemburg, Bavaria, Austria, Poland, Russia, Finland, Sweden, France, Italy, and in Spain, and details of arrangements existing in Edinburgh for instruction in most of the subjects included amongst preliminary studies, I submitted for consideration the opinion, “that with the acquisition of this Arboretum, and with the existing arrangements for study in the University of Edinburgh, and in the Watt Institution and School of Arts, there are required only facilities for the study of what is known on the Continent as Forest Science to enable these Institutions conjointly, or any one of them, with the help of the other, to take a place amongst the most completely equipped Schools of Forestry in Europe, and to undertake the training of foresters for the discharge of such duties as are now required of them in India, in our Colonies, and at home.”

‘This year has seen world-wide arrangements for an International Exhibition of forest products and other objects of interest connected with forestry in Edinburgh, “In the interests of forestry, and to promote a movement for the establishment of a School of Forestry in Scotland, as well as with a view of furthering and stimulating a greater improvement in the scientific management of woods in Scotland and the sister countries which has manifested itself during recent years.”

‘The following is one of a series of volumes published with a view to introduce into English forestal literature detailed information on some of the points on which information is supplied to students at Schools of Forestry on the Continent ; and to make better known the breadth of study which is embraced in what is known there as *Forstwissenschaft*, or Forest Science.’

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VI.—French Forest Ordinance of 1669; with Historical Sketch of Previous Treatment of Forests in France. Price 4s.

The early history of forests in France is given, with details of devastations of these going on in the first half of the seventeenth century; with a translation of the Ordinance of 1669, which is the basis of modern forest economy; and notices of forest exploitation in *Jardinage*, in *La Methode à Tire et Aire*, and in *La Methode des Compartiments*.

EXTRACT FROM PREFACE.—“The Celebrated Forest Ordinance of 1669:” Such is the character and designation generally given at the present day to the Ordinance in question. It is known, by reputation at least, in every country on the Continent of Europe; but, so far as is known to me, it has never before been published in English dress. It may possibly be considered antiquated; but, on its first promulgation, it was welcomed, far beyond the bounds of France, as bringing life to the dead; and I know of no modern system of Forest Exploitation, based on modern Forest Science, in which I cannot trace its influence. In the most advanced of these—that for which we are indebted to Hartig and Cotta of Saxony—I see a development of it like to the development of the butterfly from what may be seen in the structure of the chrysalis; and thus am I encouraged to hope that it may prove suggestive of beneficial arrangements, even where it does not detail what it may be deemed desirable to adopt.

In my translation I have followed an edition issued with Royal approval in 1753, with one verbal alteration to bring it into accordance with certain older approved editions, and with another verbal alteration to bring it into accordance with editions issued in 1699, 1723, 1734, and 1747.

Translation of notice by M. DE LA GRYE for July 1883 in the *Revue des Eaux et Forêts*: ‘England, which with her immense possessions in India, in Canada, and in the Cape of Good Hope, is beyond all question a State rich in forests, has never up to the present time given to this portion of her domains more than a very moderate share of her attention; but for some years past public opinion is becoming alarmed, in view of the immense devastations which have been committed in them, and the forest question coming forward spontaneously has become the subject of numerous publications: amongst which, after the excellent monthly collection, the *Journal of Forestry and Estate Management*, comes the Translation of the Ordinance of 1669, which has just been published by Mr John Croumbie Brown. This translation of a monument of jurisprudence, well known in France, but which has never before been reproduced in English, has furnished to Mr Brown an opportunity of giving a historical sketch of French Forest Legislation, and an exposition of the

different methods of exploitation followed in our country. Drawn from the best sources, and commented on with talent, these documents form an elegant volume, which the author has made the more complete by binding with it a summary of the treatise he has published on the Forests of England.'

VII.—Pine Plantations on Sand Wastes in France.
Price 7s.

In this are detailed the appearances presented by the Landes of the Gironde before and after culture, and the Landes of La Sologne; the legislation and literature of France in regard to the planting of the Landes with trees; the characteristics of the sand wastes; the natural history, culture, and exploitation of the maritime pine, and of the Scots fir; and the diseases and injurious influences to which the maritime pine is subject.

EXTRACTS FROM PREFACE.—'The preparation of this volume for the press was undertaken in consequence of a statement in the *Standard and Mail*, a Capetown paper, of the 22d July 1876, to the effect that in the estimates submitted to Parliament £1000 had been put down for the Cape Flats, it was supposed with a view to its being employed in carrying out planting operations as a means of reclaiming the sandy tracts beyond Salt River.

'This volume was originally compiled in view of what seemed to be required at the Cape of Good Hope. It has been revised and printed now, as a contribution towards a renewed enterprise to arrest and utilise sand-wastes which stretch from Table Mountain to the Hottentot Holland Mountains; and additional information is forthcoming if it should be desired.'

VIII.—Reboisement in France; or, Records of the Re-planting of the Alps, the Cevennes, and the Pyrenees, with Trees, Herbage, and Bush, with a view to arresting and preventing the destructive consequences of torrents. Price 12s.

In this are given a *résumé* of Surell's study of Alpine torrents, of the literature of France relative to Alpine torrents, and of remedial measures which have been proposed for adoption to prevent the disastrous consequences fol-

owing from them—translations of documents and enactments, showing what legislative and executive measures have been taken by the Government of France in connection with *réboisement* as a remedial application against destructive torrents—and details in regard to the past, present, and prospective aspects of the work.

EXTRACT FROM PREFACE.—' In a treatise on the Hydrology of South Africa I have given details of destructive effects of torrential floods at the Cape of Good Hope and Natal, and referred to the measures adopted in France to prevent the occurrence of similar disastrous floods there. The attention of the Legislative Assembly at the Cape of Good Hope was, last year, called by one of the members of the Assembly to the importance of planting trees on unproductive Crown lands. On learning that this had been done I addressed to the editor of the *Cape Argus* a communication, of which the following is a copy :—

"I have before me details of destructive effects of torrents which have occurred since I left the Colony in the beginning of 1867. Towards the close of that year there occurred one, the damage occasioned by which to roads and to house property at Port Elizabeth alone was estimated at from £25,000 to £30,000. Within a year thereafter a similar destructive torrent occurred at Natal, in regard to which it was stated that the damage done to public works alone was estimated at £50,000, while the loss to private persons was estimated variously from £50,000 to £100,000. In the following year, 1869, a torrent in the Western Province occasioned the fall of a railway bridge, which issued in loss of life and loss of property, and personal injuries, for one case alone of which the railway proprietors were prosecuted for damages amounting to £5000. In Beaufort West a deluge of rain washed down the dam, and the next year the town was flooded by the waters of the Gamko ; and the next year, 1871, Victoria West was visited with a similar disaster. Such are the sums and the damages with which we have to deal in connection with this question, as it affects the case ; and these are only the most remarkable torrents of the several years referred to. I have spoken of millions of francs being spent on *réboisement* in France, and some may be ready to cry out, 'Nothing like such an expenditure can be undertaken at the Cape !' Perhaps not ; but the losses occasioned by the torrents seem to amount at present to about a million of francs in the year. This falls in a great measure on individuals, that would fall on the community ; and the community in return would benefit by water retained to fertilize the earth, instead of being lost in the sea, and by firewood and timber being grown where now there is none. These are facts well deserving of consideration in the discussion of the expediency of planting Crown lands with trees."

Towards the close of last year, 1874, still more disastrous effects were produced by torrential floods. According to the report given by one of the Colonial newspapers, the damages done could not be estimated at much less than £300,000. According to the report given by

another, the damage done to public works alone was estimated at £350,000,—eight millions, seven hundred and fifty thousand francs. And my attention was called anew to the subject.

On addressing myself to M. Faré, Director-General of the Administration of Forests in France, there was afforded to me every facility I could desire for extending and verifying the information I had previously collected in regard to the works of *réboisement* to which I have referred. Copies of additional documents were supplied to me, with copies of works sanctioned by the Administration, and arrangements were made for my visiting and inspecting, with every assistance required, the works begun and the works completed; and thus I have been enabled to submit a much more complete report than it would otherwise have been in my power to produce.

While the compilation I have prepared owes its publication at this time to the occurrence of the inundations of last year at the Cape of Good Hope, the publication has been undertaken in the hope that in other countries besides South Africa the information may be turned to practical account.'

Translation of extract from letter to the author by M. ALEXANDRE SURELL, *Ingenieur des Ponts et Chaussees*, chairman of the *Compagnie des Chemins des Fer du Midi et du Canal lateral à la Garonne*, and author of *Étude sur les Torrents des Hautes-Alpes. Ouvrage Couronne par l'Academie des Sciences en 1842* :—' You are rendering an eminent service to society in calling the attention of serious thinkers to the subject of *réboisements* and *gazonnements*. It is a vital question affecting our descendants, especially in southern climates, there are useful truths which have to be diffused there, and you have fulfilled this duty amongst your countrymen.

' In France public opinion, long indifferent, is now sufficiently enlightened on the question, and much has been done.

' I have been able to establish in the course of a recent journey that, throughout a great part of Switzerland, in Styria, in Ruthenia, and in the Tyrol, the same phenomena which have issued in the desolation of our French Alps are beginning to produce the same effects. There have been recognised a number of extinct torrents which had originated in the destruction of the forests. If people go on sleeping, posterity will have a sad inheritance devolved upon it.

' You have given, with very great clearness, a *résumé* of what I have done in France, be it by my works, or be it by my workings, for the regeneration of our mountains.'

Translation of extract from letter by the late M. Ernest Cézanne, *Ingenieur des Ponts et Chaussees, Représentant des Hautes Alpes à l'Assemblée Nationale*, and author of *Une Suite* to the work of M. Surell. ' The post brought to me yesterday your very interesting volume on *Réboisement*. I at once betook myself to the perusal of it; and I am surprised that a foreigner could digest so completely such a collection of our French documents drawn from so many diverse sources. The problem

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of *réboisement* and the regeneration of the mountains is one of the most interesting which man has to solve, but it requires time and money, and with the authorities and political assemblies, technical knowledge which is as yet but very sparingly possessed. It is by books so substantial as yours, sir, that public opinion can be prepared to face the importance of this great work.'

IX.—Hydrology of South Africa; or Details of the Former Hydrographic Condition of Cape of Good Hope, and of Causes of its Present Aridity, with Suggestions of Appropriate Remedies for this Aridity. Price 10s.

In this the desiccation of South Africa, from pre-Adamic times to the present day, is traced by indications supplied by geological formations, by the physical geography or the general contour of the country, and by arborescent productions in the interior, with results confirmatory of the opinion that the appropriate remedies are irrigation, arboriculture, and an improved forest economy: or the erection of dams to prevent the escape of a portion of the rainfall to the sea—the abandonment or restriction of the burning of the herbage and bush in connection with pastoral and agricultural operations—the conservation and extension of existing forests—and the adoption of measures similar to the *réboisement* and *gazonnement* carried out in France, with a view to prevent the formation of torrents, and the destruction of property occasioned by them.

M. Jules Clavé, of world-wide reputation as a student of Forest Science, wrote in the *Revue des Deux Mondes* of 1st May 1882:—

[Translated.] 'Since the first travels of Livingstone, the African continent, hitherto inaccessible, has been attacked on all points at once. By the north, and by the south, by the east, and by the west, hardy explorers have penetrated it, traversed it, and have dragged from it some of its secrets. Travellers have paid tribute and done their work in opening up a path; it is now for science and civilisation to do theirs, and in drawing in the current of general circulations the peoples and lands, which appear as if destined to stand outside; and in causing to

contribute to the increase of social wealth the elements of production previously unknown. Thus are we led to receive with interest works which can throw a new light on the condition of regions which may have been known for a long time, and which make known the conditions of their prosperity. It is under this title that the work of the Rev. J. C. Brown on the *Hydrology of South Africa* appears deserving of notice ; but it is so also from other points of view. Mr Brown, after a previous residence in the colony of the Cape, whither he had been sent in 1844 as a missionary and head of a religious congregation, returned thither in 1863 as Professor of Botany in the College of South Africa, and he remained there some years. In both of these positions he had occasion to travel through the colony in all directions, and had opportunities to collect most valuable information in regard to its physical geography. Mr Brown on going out to the Cape knew nothing of the works which had for their object to determine the influence of forests on the climate, on the quantity of rain, and on the river-courses in Europe ; he had never heard mention of the work of M. Surell on the torrents of the Alps, or of that of M. Mathieu on forest meteorology, nor of those of M. Domontzey, Costa de Bastelica, and so many others on the subject of *réboisement* ; and yet in studying by himself, and without bias, the climatic condition of South Africa, he came to perceive that the disturbances in the regularity of the flow of rivers within the historic period should be attributed in a large measure to the destruction of forests ; and he meets in agreement on this point the *savants* whose names have been mentioned. We have thought it might not be without interest to readers of the *Revue* to have in the lines of Mr Brown a collection of phenomena which, in their manifestation at any specified point are not less due to general causes, the effects of which may be to make themselves felt everywhere where there may be existent the same conditions than to aught else. And there follows a lengthened article in illustration.

X.—Water Supply of South Africa, and Facilities for the Storage of it. Price 18s 6d.

In this volume are detailed meteorological observations on the humidity of the air and the rainfall, on clouds, and winds, and thunder-storms ; sources from which is derived the supply of moisture which is at present available for agricultural operations in the Colony of the Cape of Good Hope and regions beyond, embracing the atmosphere, the rainfall, rivers, fountains, subterranean streams and reservoirs, and the sea ; and the supply of water and facilities for the storage of it in each of the divisions of the colony

—in Basutoland, in the Orange River Free State, in Griqualand West, in the Transvaal Territory, in Zululand, at Natal, and in the Transkei Territory.

EXTRACT FROM PREFACE.—‘Appended to the Report of the Colonial Botanist at the Cape of Good Hope for 1866 was an abstract of a Memoir prepared on the Hydrology of South Africa, which has since been embodied in a volume which has been published on that subject, and an abstract of a Memoir prepared on Irrigation and its application to agricultural operations in South Africa, which embraced a Report on the Water Supply of the Colony; its sources, its quantity, the modes of irrigation required in different circumstances, the facilities for the adoption of these in different districts, and the difficulties, physical and other, in the way of works of extensive irrigation being carried out there, and the means of accomplishing these which are at command.

‘In the following volume is embodied that portion of the Memoir which related to the water supply, and the existing facilities for the storage of this, with reports relative to this which were subsequently received, and similar information in regard to lands beyond the Colony of the Cape of Good Hope, which it has been sought to connect with the Colony by federation, or otherwise; and the information relative to irrigation has been transferred to a Report on the Rivers of the Colony, and the means of controlling floods, of preventing inundations, of regulating the flow of rivers, and utilising the water by irrigation otherwise.

‘In the series of volumes to which this belongs its place is immediately after that on the *Hydrology of South Africa*, which contains details of the former hydrographic condition of the Cape of Good Hope, and of causes of its present aridity, with suggestions of appropriate remedies for this aridity; and it has been prepared to show that, not in a vague and general use of the terms, but in strict accordance with the statement, the severe, protracted, and extensive droughts, and destructive floods and inundations, recorded in the former volume, find their counterpart in constantly alternating droughts and deluges in every district of the Colony,—and that, in every so-called division of it, notwithstanding the deluges, there were protracted sufferings from drought, and, notwithstanding the aridity, there is a supply of water at command, with existing facilities for the storage of the superabundant supply which at present proves productive of more evil than good.’

Statement by Reviewer in *European Mail*.—‘Dr Brown is well known at the Cape, for in the exercise of his duties he travelled over the principal part of it, and much, if not indeed the substance, of the bulky volume before us, has been before the Cape public in the form of Reports to the local Government. As these reports have been commented upon over and over again by the local press there is little left for us to say beyond the fact that the author reiterates his opinion that the only panacea for the drought is to erect dams and other irrigation works for the storage of water when the rains come down. There can be no doubt

that this is sage and wholesome advice, and the only question is, who is to sustain the expense? Not long ago, somewhere about the time that Dr Brown was prosecuting his labours, it will be remembered that General Wynard said that "Nature had furnished the cups if only science would take the trouble to make them secure." It is but to repeat an oft-told story that with a good supply of water South Africa would be one of the finest of nature's gardens, and would be capable of producing two crops a year, in addition to furnishing fodder for sheep and cattle. The question of the water supply for irrigation and other purposes has been staved off year after year, and nothing has been done. It is not too much to say, however, that the question must make itself felt, as it is one of the chief factors in the ultimate prosperity of South Africa. The author is evidently in love with his subject, and has contributed a mass of facts to Hydrology which will be useful to all countries of an arid character.'

XI.—Forests and Moisture; or Effects of Forests on Humidity of Climate. Price 10s.

In this are given details of phenomena of vegetation on which the meteorological effects of forests affecting the humidity of climate depend—of the effects of forests on the humidity of the atmosphere, and on the humidity of the ground, on marshes, on the moisture of a wide expanse of country, on the local rainfall, and on rivers—and of the correspondence between the distribution of the rainfall and of forests—the measure of correspondence between the distribution of the rainfall and that of forests—the distribution of the rainfall dependent on geographical position, or determined by the contour of a country—the distribution of forests affected by the distribution of the rainfall—and the local effects of forests on the distribution of the rainfall within the forest district.

EXTRACTS FROM PREFACE.—'This volume is one of a series. In the first of the series—a volume entitled—published last year, *Hydrology of South Africa; or, Details of the Former Hydrographic Condition of the Cape of Good Hope and of Causes of its recent Aridity, with Suggestions of appropriate Remedies for this Aridity.*

'This volume, on the effects of forests on the humidity of the atmosphere and the ground, follows supplying illustrations of the reasonableness of the suggestion made in regard to the conservation and extension of forests as a subordinate means of arresting and counteracting the desiccation and aridity of the country.'

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EXTRACTS FROM LETTERS to the author from the late Hon. George P. Marsh, Minister of the United States at Rome, and author of *The Earth as Modified by Human Action* :—‘ I am extremely obliged to you for a copy of your *Révoiement in France*, just received by post. I hope the work may have a wide circulation. . . . Few things are more needed in the economy of our time than the judicious administration of the forest, and your very valuable writings cannot fail to excite a powerful influence in the right direction. ’

‘ I have received your interesting letter of the 5th inst., with the valuable MSS. which accompanied it. I will make excerpts from the latter, and return it to you soon. I hope the very important facts you mention concerning the effect of plantations on the island of Ascension will be duly verified. ’

‘ I put very little faith in *old* meteorological observations, and, for that matter, not much in *new*. So much depends on local circumstances, on the position of instruments, &c.—on *station*, in short, that it is only on the principle of the tendency of some to balance each other that we can trust to the registers of observers not known to be trained to scientific accuracy. Even in observatories of repute, meteorological instruments are seldom properly hung and guarded from disturbing causes. Beyond all, the observations on the absorption of heat and vapour at small distances from the ground show that thermometers are almost always hung too high to be of any value as indicating the temperature of the stratum of the atmosphere in which men live and plants grow, and in most tables, particularly old ones, we have no information as to whether the thermometer was hung five feet or fifty feet from the ground, or whether it was in any way protected from heat radiated from near objects. ’

EXTRACT LETTER from the late Professor Henry, of the Smithsonian Institution, Washington :—‘ The subject of Forest Culture and its influence on rainfall is, just at this time, attracting much attention in the United States. At the last meeting of the American Association for the advancement of science a committee was appointed to memorialise Congress with reference to it. Several of the Western States Governments have enacted laws and offered premiums in regard to it. The United States Agricultural Department has collected statistics bearing on the question, and we have referred your letter to that establishment. ’

‘ The only contribution that the Smithsonian Institution has made to the subject is that of a series of rain-fall tables, comprising all the observations that have been made in regard to the rainfall in the United States since the settlement of the country ; a copy of this we have sent to your address. ’

‘ It may be proper to state that we have commenced a new epoch, and have, since the publication of the tables in question, distributed several hundred rain gauges in addition to those previously used, and to those which have been provided by the Government in connection with the signal service. ’

These notices and remarks are cited as indicative of the importance which is being attached to the subject discussed.

EXTRACT FROM LETTER to the author from Lieut.-Col. J. Campbell Walker, Conservator of Forests, Madras, then Conservator-in-Chief of Forests, New Zealand; author of *Report on State Forests and Forest Management in Germany and Austria* :—‘I am in receipt of yours, along with the notices of your works on Forestry, by book post. I think very highly of the scope of the works, and feel sure that they and similar works will supply a want much felt by the Indian forest officers.

‘It contains many important data which I should have vainly sought elsewhere, and it will be regarded by all competent judges as a real substantial contribution to a knowledge of the existing surface, and the changes which, from known or unknown causes, that surface is fast undergoing.’

Copies of any of these Works will be sent post-paid to any address within direct Postal communication with Britain, on receipt by Dr JOHN C. BROWN, Haddington, of a Post-Office Order for the price.

